

Remarks:

In response to the earlier restriction requirement, claim 16-18 have been withdrawn from consideration.

Claims 1-15 remain for consideration in the application.

Briefly stated, in accordance with one aspect, the claimed invention relates to a method of inactivating enzyme in the production of liquid food product. **The method comprises steps which are to be performed concomitantly.** One of the steps is to maintain the solid food and the liquid in a grinder under a pressure higher than ambient pressure while other steps are being performed. Other steps are to disintegrate the solid food and to heat the solid food and resulting slurry above a predetermined temperature. (Emphasis added)

Dealing with items in the Office Action in order:

(2) The missing line has been added on page 1. The Examiner is correct in that the line refers to the present Applicant's earlier U.S. Patent. It is believed that said patent is now fully identified.

(2) (sic) Claims 1-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite. In particular, in claims 1 and 4, confusion exists between "enzyme" and "enzymes". Claims 1 and 4 have now been amended to remedy the confusion. In claims 7-12, "cooking temperature" is objected to. The Examiner refers to the statement on Page 3, line 21. It is respectfully requested that the quoted statement be amended to read "about 100°C or above". This statement appears on page 4, line 31 of the present specification and is believed to be more precise. It is therefore respectfully submitted that it is not a new matter. **The cooking temperature is usually about 100°C or below under ambient pressure. In the present invention, however, the process is performed under a pressure higher than ambient pressure, which could result in the temperature above 100°C.** (Emphasis added) The Examiner questions the lower limit of "cooking temperature" but as seen in the above discussion the cooking

temperature is "about 100°C or above".

(3) Claims 1-3 are rejected under 35 U.S.C. 102 (b) as being anticipated by JP 63063358.

The Examiner states:

JP 63063358 discloses a process of applying heat (over 100°C and also including the use of steam injection) and pressure in a process involving disintegrating of soybeans and, in doing so, creating a slurry.

The Applicant believes that the cited Japanese patent fails to teach concomitant performance of claimed steps, i.e., maintenance of an above-ambient pressure, disintegration and heating under such a pressure. As taught on page 5, line 6, et seq, by maintaining the pressure during grinding and heating, the operating window of the hot grinding method for inactivating an off-flavour producing enzyme is extended much wider in temperature, which results in more economical processing. As taught on page 3, lines 21-22 of the present disclosure, another advantage is that absence or presence of air during disintegration is relatively unimportant.

The Japanese patent teaches a technique of obtaining hyper fine-grained soybean milk. It uses following steps to be performed in sequence (Emphasis is Applicant's): (1) grinding soy beans immersed in water, (2) heat-treating by steam a soybean slurry obtained in (1), (3) pressure-filtering the heat treated slurry to separate soymilk and okara, (4) heat-treating the soymilk under high pressure or alternatively microwaving the soymilk, and (5) homogenizing the soymilk treated in (4).

As seen in the above description, the Japanese patent conducts steps (1) and (2), i.e., grinding and heat-treating of soybean slurry, **under ambient pressure**. At step (3), **pressure is applied only to filter the slurry**. The Japanese patent uses additional steps of steps (4) and (5) above to obtain hyper fine-grained soymilk. The Japanese patent is completely silent about **inactivating off-flavor producing enzyme by concomitance performance of maintaining the pressure in a grinder, grinding the solid and heat-treating the solid and slurry above a predetermined temperature**. (Emphases

added)

It is respectfully submitted therefore that amended claims 1-3 are not anticipated by JP 63063358 and are patentable under 35 U.S.C. 102 (b).

(4) Claims 1-3 are rejected under 35 U.S.C 103 (a) as being unpatentable over JP 63063358 taken together with JP 69140845.

The Examiner states in part:

JP69140845 teaches grinding soybeans under pressure and heat wherein such action contribute in reducing the incidence of odor due to lipoxygenase activation.

Contrary to the Examiner's comment quoted above, JP69140845 describes **steps of heating unground soybeans to 130-190°C under pressure and then grinding cooked soybeans under ambient pressure. Heating and grinding are performed in sequence.** (Emphasis added)

It is therefore respectfully submitted that JP 63063358 and JP 69140845, taken singly or in combination, fail to teach or suggest **concomitance performance of maintaining the pressure in a grinder, grinding the solid and heat-treating the solid and slurry above a predetermined temperature.** (Emphasis added)

It is therefore respectfully submitted that claims 1-3 are patentable under 35 U.S.C 103 (a) over JP 63063358 taken together with JP 69140845.

(5) Claim 4-6 are rejected under 35 U.S.C. 103 (a) as being unpatentable over the references as applied in either one of paragraphs (3) or (4) and further in view of Gupta et al (U.S. Patent No. 4,744,524).

The Examiner states:

The claims further calls for treatment in an oxygen-free environment. However, it is well known to process soybeans in an oxygen-free environment as a way to minimize or eliminate beany flavour. Gupta et al, for example, teaches same.

It is respectfully submitted that JP 63063358 and JP 69140845, taken singly or in combination, fail to teach or suggest the claimed method in which **the cited steps are conducted concomitantly**. (Emphasis added) Those concomitance steps are

maintaining the solid food in a liquid under a pressure higher than ambient pressure in a grinder, disintegrating the solid food in the liquid under the pressure, and concomitantly heat-treating under the pressure the solid food in the liquid and resulting slurry above a predetermined temperature to inactivate the enzyme. (Emphases added)

More particularly, JP 63063358 describes steps of grinding soybeans immersed in water, heat-treating the resulting slurry and then pressure filtering the cooked slurry to obtain soy milk. **All these steps are conducted in sequence.** (Emphasis added) JP 63063358 also describes a subsequent step of further heat treating under pressure the filtered soy milk only to obtain hyper fine-grained soymilk. It is clear that concomitant steps of grinding and heating under pressure is neither taught nor even suggested. As discussed above, JP 69140845, on the other hand, describes **sequential steps of heating unground soybeans to 130-190°C under pressure and then grinding cooked soybeans under ambient pressure.** (Emphasis added)

It is agreed that Gupta et al teach, not only in their patent cited above but also in their patent referred to on page 1 of the present specification, that soybeans can be ground in an oxygen-free environment to prevent enzyme reaction which may produce beany flavour. It is however submitted that in the cited patents to Gupta et al, grinding is conducted under either ambient pressure or a pressure less than ambient pressure.

As seen in the above discussion, neither Japanese reference describes the technique of conducting the claimed steps concomitantly. Combining the Japanese references with the cited patent of Gupta et al does not teach or even suggest the method being claimed.

It is therefore respectfully submitted that claims 4-6 are patentable under 35 U.S.C 103 (a) over JP 63063358 taken together with JP 69140845, further in view of Gupta et al

(U.S. Patent No. 4,744,524).

(6) Claims 7-11 are rejected under 35 U.S.C. 103 (a) as being unpatentable over the references as applied in any one of paragraphs 3-5 further in view of Nsofor.

The Examiner states in parts:

The claims further call for a vacuum deodorizing step of the slurry. However, such is well known in soybean processing as taught, for example, by Nsofor. The claims further call for the further extraction of the liquid from the slurry and that same is achieved by centrifugal extraction. However, it is known to do same as taught, for example, by Gupta et al.

It is agreed that Nsofor and Gupta et al describe vacuum deodorizing and centrifugal extraction respectfully. It is however respectfully submitted that the claims under discussion recite at least three simultaneous steps of maintenance of an above-ambient pressure, disintegration of soybeans and heating of soybeans and slurry under such a pressure. These steps are not taught or even suggested in any of the cited references, taken singly or in combination.

It is therefore respectfully submitted that claims 7-11 are patentable under 35 U.S.C 103 (a) over JP 63063358 taken together with JP 69140845, further in view of Gupta et al (U.S. Patent No. 4,744,524) and Nsofor.

(7) Claims 12-15 are rejected under 35 U.S.C. 103 (a) as being unpatentable over the references as applied in any one of paragraphs 3-5 further in view of Uchi et al.

The Examiner states:

The claims call for vacuum deodorizing the extracted liquid food product (rather than the slurry). However, such is well known in the art as taught, for example, by Uchi et al and doing so in conjunction with using an oxygen-free environment. The claims further call for the further extraction of the liquid from the slurry and that same is achieved by centrifugal extraction. However, it is known to do same as taught, for example, by Gupta et al.

It is agreed that Uchi et al and Gupta et al describe vacuum deodorizing extracted liquid food product and centrifugal extraction respectfully. It is however respectfully submitted that the claims under discussion recite at least three simultaneous steps of maintenance of an above-ambient pressure and disintegration of soybeans and heating of soybeans and slurry under such a pressure. These steps are not taught or even suggested in any of the cited references, taken singly or in combination.

It is therefore respectfully submitted that claims 12-15 are patentable under 35 U.S.C 103 (a) over JP 63063358 taken together with JP 69140845, further in view of Gupta et al (U.S. Patent No. 4,744,524), Nsofor and Uchi et al.

Having dealt with all the rejections and objections raised in the Office Action, reconsideration and allowance of the application as amended is earnestly solicited.

Respectfully Submitted

A handwritten signature in black ink, appearing to read 'R. P. Gupta', with a stylized flourish at the end.

Rajendra P. Gupta

Applicant and inventor